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**DRAFT REGULATORY EVALUATION, INITIAL
REGULATORY FLEXIBILITY DETERMINATION,
UNFUNDED MANDATES REFORM ACT, AND TRADE
IMPACT ASSESSMENT**

**FLIGHT PLAN REQUIREMENTS FOR
HELICOPTER OPERATIONS UNDER
INSTRUMENT FLIGHT RULES**

**NOTICE OF PROPOSED RULEMAKING
(14 CFR PARTS 21, 27, 29, and 91)**

**OFFICE OF AVIATION POLICY AND PLANS
OPERATIONS REGULATORY ANALYSIS BRANCH, APO-310**

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EXECUTIVE SUMMARY

This regulatory evaluation examines the benefits and costs associated **with** the proposed rule to amend 14 CFR parts 91.167 (b) and 91.169 (b) and (c) that pertain to the flight plan requirements for helicopter operations under instrument flight rules. The purpose of this rulemaking is to facilitate helicopter pilots access to the IFR system. The proposed rule would revise the destination airport criteria for specifying an alternate airport and the weather minimums necessary to designate an alternate airport on a flight plan.

The NPRM would not place any additional requirements on the aviation industry. Therefore, there is no compliance costs associated with the proposed rule. The proposed rule could achieve potential safety benefits of \$48 million (\$34 million, present value) over the next 10 years. In addition, there are the non-quantified benefits of reduced aircraft noise at ground level, and the lessening of helicopter idle time due to adverse or marginal weather conditions.

The proposed rule would not present a significant impediment to either U.S. firms doing business abroad, or foreign firms doing business in the United States. Furthermore, the FAA has determined that the proposed rule would not have a significant economic impact on a substantial number of small entities.

This rule does not contain any Federal intergovernmental or private sector mandate.

Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.

I. INTRODUCTION

In an effort to promulgate regulations that improve aviation safety and promote efficiency, this notice of proposed rulemaking (**NPRM**) puts forth the recommendations of the Federal Aviation Administration (FAA) and the Aviation Rulemaking Advisory Committee (ARAC). This regulatory evaluation examines the costs and benefits of the proposed rule to amend 14 CFR part 91.167 (b), and 14 CFR part 91.169 (b) and (c). These amendments pertain to flight plan requirements for helicopter flights under instrument flight rules (IFR) by revising: (1) the destination airport criteria for specifying an alternate airport, and (2) the weather minimums necessary to designate an alternate airport in a flight plan.

Marginal weather conditions that result in inadvertent flights into Instrument Meteorological Conditions (**IMC**) is one of the more serious hazards that helicopter pilots encounter. This proposal should motivate more helicopter pilots to operate under IFR in marginal weather conditions. By allowing more IFR helicopter flights during marginal weather conditions in place of VFR flights, the occurrence of inadvertent VFR flights into IMC should be reduced.

II. BACKGROUND

A person operating a civil aircraft under IFR conditions must comply with the IFR fuel requirements of § 91.167 and the IFR flight plan requirements of § 91.169. If a person cannot

meet the flight plan requirements and criteria for specifying an alternate airport in § 9 1.169, then he or she may not file an IFR flight plan, and must fly under VFR.

Sections 9 1.167 and 9 1.169 were originally established to cover all aircraft, but particularly airplanes, operating under IFR. Other than the distinction in § 9 1.167 concerning the amount of fuel a helicopter must carry versus the amount of fuel an airplane must carry, flight planning requirements, including alternate airport weather minimums, are the same for both airplanes and helicopters, even though their operating characteristics are quite different.

The FAA recognizes that helicopter operations are more range limited and more flight-time limited than airplane operations. Helicopters fly shorter distances at slower speeds than airplanes, and generally remain in the air for shorter periods between refueling stops. Since a helicopter is usually in the air for a shorter time than an airplane, the helicopter pilot is more likely to encounter weather conditions consistent with earlier forecasts at the destination helipad, than an airplane pilot will at his or her destination airport. Consequently, the weather forecast for the flight destination at the estimated time of arrival (ETA) plus one hour is more likely to prove accurate for helicopter operations than for airplane operations, and flight planning for helicopter operations should be based on the destination forecast at ETA plus one hour rather than one hour before ETA to one hour after ETA. Focusing on weather forecasts for times, such as one hour before ETA, are not as relevant and do not add anything towards the safe operation of the helicopter.

III. BENEFITS

There are some non-quantifiable benefits that can be attributed to this proposed rulemaking, such as the reduction in the level of aircraft noise experienced by individuals on the ground when helicopters fly at higher altitudes. These benefits are difficult to accurately measure, and are discussed in qualitative terms. Other benefits are more quantifiable and are derived from the reduction of the number of fatal and serious accidents that occur in marginal weather conditions.

A. Qualitative Benefits

Due to the lack of feasible alternatives to VFR, during periods of marginal or inclement weather conditions, helicopter operators often will forsake the IFR system because they are unable to meet the flight plan requirements and criteria for specifying an alternate airport. As such, the helicopter operator will fly either VFR or Special VFR at lower altitudes. By flying at lower altitudes, third party costs (increased level of aircraft noise), are experienced by individuals on the ground.

All noise has the potential to annoy because of interference with speech, sleep, work, or other activities'. However, aircraft noise is a function of aircraft altitude, and noise or sound energy

¹ Noise is commonly defined as unwanted sound, and so the measurement of noise is linked to the measurement of sound. The basic unit of sound measurement is the decibel (**dB**), which is a logarithmic transformation of sound energy. The logarithmic scale permits a relatively narrow scale to represent a wide range of sound energy that can **be detected by the** human ear. Consequently, the decibel ladder is a scale of reference **and** not a measure of absolute physical quantities. As explained in *The Economic Value of Peace and Quiet*, Starkie, D. N. M **and** Johnson, D. M., Saxon House and Lexington Books, D. C. Heath & Co., Lexington, MA, 1975., p 3., 30 decibels is a soft whisper,

can be reduced by increasing the flight altitude.’ Therefore, by providing the opportunity to increase the altitude of a helicopter flight during IMC, the proposed rule would help to reduce the sound energy on the ground generated by that helicopter. For example, if a helicopter flying VFR at 250 ft above ground level (AGL) in marginal weather conditions is able to fly IFR at 4,000 ft AGL in the same marginal weather conditions, the reduction in sound energy is 24 dB³, which represents a decrease to less than one-hundredth the level of sound intensity experienced by third parties on the ground.

Another benefit of this NPRM that is difficult to **quantify** is reducing the opportunity cost of idle upper management time. Opportunity cost is a forward-looking view of costs that are forgone by not putting a firm’s resources to its highest use. Due to the high level of concern many companies have regarding the safety of their senior executives, the safe operation of their corporate helicopter receives a high priority. As such, during periods of marginal or adverse weather conditions, most corporate operations are canceled rather than attempt to fly VFR under those conditions. A portion of the opportunity cost can be measured by the lost productivity associated with the extra time involved by senior executives using alternate forms of transportation, such as automobile. With the average annual chief executive compensation at

while 60 decibels-represents moderate speech heard at about a yard. These changes differ dramatically in sound energy; the increase from 30 dB to 60 dB represents a thousand fold increase in sound intensity.

² Analysis and Evaluation Branch, **Office** of Environment and Energy, Federal Aviation Administration. Sound or noise energy can be reduced by 6 dB for each doubling in altitude.

³ Sound energy is reduced by 6 dB for each doubling in altitude, sound energy will be reduced by 24 dB if the altitude is doubled four times (500 A, 1,000 ft, 2,000 ft, and 4,000 ft). A reduction of 20 dB represents a hundred-fold decrease in sound intensity.

\$2.3 million,' any delay could amount to as much as \$1,100 per hour⁵, not including the salaries of other senior executives traveling with the chief executive, or the cost of the helicopter and pilot sitting idle due to marginal or adverse weather conditions. By enabling more helicopter pilots to operate under IFR in marginal weather conditions, these opportunity costs could be avoided.

B. Quantitative Benefits

The quantitative benefits of this proposed rulemaking are derived **from** a potential reduction in weather related accidents. Weather related accidents are a common, serious type of accident experienced by helicopter operators, but this type of accident can be prevented by enhanced helicopter operator access into the IFR system. The FAA believes that the proposed rule will result in a level of safety equivalent to the current rule and offer greater operational flexibility for helicopter operators. The FAA bases this on the U.S. Army's experience of no mishaps over the past 16 years associated with weather planning criteria resulting from reduced helicopter ceiling and visibility minima for IFR flight planning.

Table 1 below illustrates the helicopter accidents where weather was a cause or factor over the a 10 year period from 1987 to 1996. The data used was obtained **from** the National Transportation

⁴ "Executive Pay." Business Week, April 21, 1997.

⁵ Calculated by dividing \$2.3 million by 2,080 average work hours in a year (**\$2,300,000** / 2080 = \$1,106, rounded to \$1,100).

Safety Board (NTSB) data base. The most recent accidents that occurred in 1997 are still under review, and thus no data from 1997 is used in this analysis.

TABLE 1 All Helicopter Accidents Where Weather was a Cause or Factor			
Year	Flight Plan		
	IFR	VFR	NONE
1987	2	3	29
1988	0	6	22
1989	0	10	25
1990	0	4	30
1991	0	8	15
1992	0	11	18
1993	1	8	23
1994	1	11	12
1995	1	2	16
1996	0	5	12
TOTAL	5	68	202

Source: National Aviation Safety Data Analysis Center, February 1998.

Since 1987, there have been a total of 275 helicopter accidents where weather was a cause or factor of the accident. The total includes 202 accidents involving VFR flight⁶ without a flight plan filed, 68 accidents where a VFR flight plan was filed, and five accidents where a IFR flight plan was filed. As shown in Table 1, the 202 accidents involving VFR flights is approximately 40 times greater than the five accidents that occurred under an IFR flight. In addition, the 68 accidents where VFR flight plans were filed is approximately 14 times greater than the five in IFR operation.. When the 202 accidents are added to the 68 accidents, the result is a total of 270 accidents which represents approximately 98 percent of all the accidents that occurred when

⁶ According to FAA Flight Standards Service, General Aviation and Commercial Division, a helicopter pilot may fly VFR under any weather condition with the exception of when there is zero visibility and zero ceiling. Therefore, because the 202 accidents where no flight plan was filed did not occur under the condition of zero visibility and zero ceiling they are regarded as legal VFR flights.

weather was a cause or factor. These statistics suggest the potential safety benefits of flying IFR in IMC.

Of all helicopter flights flown, approximately 10 percent are performed under an IFR flight plan.⁷ As such, the number of accidents flying IFR would be expected to be approximately 10 percent of the total accidents, or 28 accidents. However, instead of 28 accidents **only** five accidents occurred under an IFR flight plan. Because the actual number of accidents (5) is approximately 18 percent of the expected number of accidents (**28**), this information suggests that IFR flight is safer than VFR flight when marginal weather conditions are present.

Injuries sustained in weather-related helicopter accidents are illustrated in Table 2. When the fatalities sustained flying with no flight plan (74) are added to the fatalities sustained flying with

TABLE 2 Injuries Sustained in Helicopter Accidents Where Weather Was a Cause or Factor						
Year	No Flight Plan		VFR Flight Plan		IFR Flight Plan	
	Fatal	Serious	Fatal	Serious	Fatal	Serious
1987	9	5	4	0	17	0
1988	5	5	4	6	0	0
1989	5	6	3	7	0	0
1990	9	2	6	5	0	0
1991	6	2	11	0	0	0
1992	12	3	13	3	0	0
1993	16	5	2	1	3	1
1994	1	3	14	2	4	0
1995	7	1	6	0	3	0
1996	4	0	0	0	0	0
TOTAL	74	32	63	24	27	1

Source: National Aviation Safety Data Analysis Center, February 1998.

⁷ Federal Aviation Administration, Flight Standards Service, General Aviation and Commercial Division.

a VFR flight plan (63) the result is 137 fatal injuries. That represents a fatality rate more than five times the 27 fatal injuries⁸ sustained under a IFR flight plan. Similarly, when serious injuries sustained flying with no flight plan (32) are added to the serious injuries sustained flying with a VFR flight plan (24), the result is 56, compared to only one serious injury sustained in IFR flight. In aggregate, the fatal and serious injuries that occurred when no IFR flight plan was filed is approximately 7 times those that occurred under an IFR flight plan. The FAA is aware that even though weather was a cause or contributing factor in all of these accidents, this proposed rulemaking would not have prevented all of these accidents or injuries. However, the data from Table 1 and Table 2 suggest IFR flight is safer than VFR flight when marginal weather conditions are present.

In 16 of the 270 accidents involving VFR flight, the pilot-in-command had instrument ratings for helicopters, or for helicopters and airplanes. Although the weather minima for the destination airport is not known, the FAA believes that with the revised weather minimums provided by the proposal, the pilots with instrument ratings could have taken advantage of positive air traffic control services (such as obstacle avoidance) and flown IFR. However, due to the uncertainty regarding the weather at the destination airports, the FAA recognizes that all 16 of these accidents may not have been avoided. Therefore, the FAA applied the same percentage described above regarding the expected and actual accidents under IFR ($5/28 \cong 18\%$) where

⁸ According to the NTSB data base, there were 27 fatalities when flying under an IFR flight plan. However, upon closer inspection, it appears 18 of those fatalities occurred after the pilot in command had switched from IFR to VFR. As a result, only 9 fatalities occurred in the past 10 years when the pilot was flying within the IFR system. That would increase to 95 percent the percentage of fatal injuries attributable to flight outside of the IFR system.

weather was a cause or factor of the accident and determined that 3 of the 16 accidents (16 X 18% \cong 3) would not have been avoided due to this proposed rulemaking.

Table 3, below, illustrates all the serious injuries and fatalities that were sustained in the 16 accidents involving VFR flight where the pilot-in-command had instrument ratings for helicopters, as well as airplanes. To determine the potential benefits that would result from this

TABLE 3 Injuries Sustained from VFR flight into IMC Conditions Pilot in Command Helicopter Instrument Rated			
Injury Type	No Flight Plan	VFR Flight Plan	Total
Fatal	5	12	17
Serious	6	7	13

Source: National Aviation Safety Data Analysis Center, February 1998.

proposed rule, the FAA estimated the average costs associated with all the injuries and fatalities illustrated in Table 3. A critical economic value of \$2.7 million and \$5 18,000 was applied to each human fatality and serious injury, respectively.’ This computation resulted in an estimate of approximately \$53 **million**¹⁰ in casualty costs. Also, the **value** of the destroyed aircraft was estimated to be \$7 million.¹¹ If this rulemaking helps prevent 80 percent of these injuries and

⁹ Based on critical economic value guidelines developed by the U. S. Department of Transportation.

¹⁰ Calculated as follows: \$2.7 million times 17 fatalities equals **\$45,900,000** and \$5 18,000 times 13 serious injuries equals **\$6,734,000**. Adding **\$45,900,000** and **\$6,734,000** equals **\$52,634,000** rounded to \$53 million.

¹¹ Estimates based on values listed in Airclaims, International Aircraft Price Guide, Winter, 1996. Values **used** represented the lowest in a range for each make and model helicopter involved. Actual estimated value of destroyed aircraft was **\$7,446,000**.

fatalities that resulted from 16 accidents, the expected potential safety benefits over the next ten years would be approximately \$48 million (\$34 million, discounted), as shown in Table 4.

TABLE 4 Expected Value of Potential Safety Benefits (1997 dollars)¹			
Year	Annual Safety Benefits		Discounted Safety Benefits
1998	\$ 4,806,448		\$ 4,492,007
1999	\$ 4,806,448		\$ 4,198,138
2000	\$ 4,806,448		\$ 3,923,493
2001	\$ 4,806,448		\$ 3,666,816
2002	\$ 4,806,448		\$ 3,426,931
2003	\$ 4,806,448		\$ 3,202,739
2004	\$ 4,806,448		\$ 2,993,214
2005	\$ 4,806,448		\$ 2,797,396
2006	\$ 4,806,448		\$ 2,614,389
2007	\$ 4,806,448		\$ 2,443,354
Total	\$ 48,064,480		\$ 33,758,479

Source: U. S. Dept. of Trans., FAA, APO-3 10, February, 1998

IV. COSTS

The proposed rule is not imposing any additional equipment, training, or other cost to the aviation industry. Therefore, the FAA believes there is no apparent compliance cost associated with the proposed rule. However, the FAA solicits comments regarding the plausibility and extent of the adverse impacts on operators **from** implementation of the proposed rule.

V. COMPARISON OF COSTS AND BENEFITS

The NPRM would not place any additional requirements on the aviation industry. Therefore, there is no compliance costs associated with the proposed rule. Qualitative benefits from the proposed rule would come **from** reducing the level of aircraft noise experienced by individuals on the ground and from cost savings associated with reducing transportation time for high level corporate executives. The quantitative benefits come from a potential reduction in accidents by enabling more helicopter pilots to operate under IFR in marginal weather conditions. Over the next 10 years, the estimated safety benefit of the proposed **rule** could be \$48 million or \$34 million, present value. Therefore, the FAA has determined that the proposed **rule** is cost beneficial

VI. INITIAL REGULATORY FLEXIBILITY ASSESSMENT

The Regulatory Flexibility Act of 1980 (RFA), as amended, was enacted by Congress to ensure that small entities are not unnecessarily and disproportionately burdened by Government regulations. The Act requires that whenever an agency publishes a general notice of proposed rulemaking, an initial **regulatory** flexibility analysis identifying the economic impact on small entities, and **considering** alternatives that may lessen those impacts must be conducted if the proposed rule would have a significant economic impact on a substantial number of small entities.

This proposed rule will impact entities regulated by parts 21, 27, 29, and 91. The FAA has believes that there is no compliance costs associated with the proposed amendments. Therefore, the FAA certifies that this proposed rule will not have a significant economic impact on a substantial number of small entities. However, the FAA solicits comments from operators that feel they would be negatively impacted **from** implementation of the proposed rule.

VII. INTERNATIONAL TRADE IMPACT STATEMENT

This proposed rule is not expected to impose a competitive disadvantage to either US air carriers doing business abroad or foreign air carriers doing business in the United States. This assessment is based on the fact that this proposed rule would not impose additional costs on either US or foreign air carriers. This proposal would have no effect on the **sale** of foreign aviation products or services in the United States, nor would it affect the sale of United States aviation products or services in foreign countries.

VIII. UNFUNDED MANDATES REFORM ACT ASSESSMENT

Title II of the Unfunded Mandates Reform Act of 1995 (the Act), enacted as Pub. L. 104-4 on March **22, 1995**, requires each Federal agency, to the extent permitted by law, to prepare a written assessment of the effects of any Federal mandate in a proposed or final agency rule that may result in the expenditure by State, local, and tribal governments, in the aggregate, or by the private sector, of \$100 million or more (adjusted **annually** for inflation) in any one year. Section

204(a) of the Act, 2 U.S.C. 1534(a), requires the Federal agency to develop an effective process to permit timely input by elected officers (or their designees) of State, local, and tribal governments on a proposed “significant intergovernmental mandate.” A “significant intergovernmental mandate” under the Act is any provision in a Federal agency regulation that would impose an enforceable duty upon State, local, and tribal governments, in the aggregate, of \$100 million (adjusted annually for inflation) in any one year. Section 203 of the Act, 2 U.S.C. 1533, which supplements section 204(a), provides that before establishing any regulatory requirements that might significantly or uniquely affect small governments, the agency shall have developed a plan that, among other things, provides for notice to potentially affected small governments, if any, and for a meaningful and timely opportunity to provide input in the development of regulatory proposals.

This rule does not contain any Federal intergovernmental or private sector mandate. Therefore, the requirements of Title II of the Unfunded Mandates Reform Act of 1995 do not apply.